

REMARKS

The Examiner is thanked for the allowance of claim 27 and for indicating that claims 8, 17-18, 22-24, 58-59, 65, 72, 80-81, 85-87, 90, 95-96, and 102 contain allowable subject matter.

By this amendment, claims 2, 4, and 54 are amended. No claims are added or canceled. Hence, claims 2-8, 10-27, and 54-102 are pending.

I. STATUS OF CLAIMS

Claim 27 stands allowed.

Claim 2 has been objected to because of an informality. Claims 12-13, 66, and 75-76 have been objected to as being dependent on an objected base claim.

Claims 2-7, 10-16, 19-21, 25-26, 54-57, 60-64, 67-71, 73-79, 82-84, 88-89, and 91-104 have been rejected under 35 U.S.C. §102(e) as allegedly anticipated by Wahl et al., U.S. Patent No. 6,324,654 ("WAHL").

Claims 8, 17-18, 22-24, 27, 58-59, 65, 72, 80-81, 85-87, 90, 95-96, and 102 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form.

II. RESPONSE TO THE OBJECTIONS

The Applicants respectfully submit that the amendment to claim 2 addresses the objections of the Office Action with respect to claims 2, 12-13, 66, and 75-76. Therefore, withdrawal of the objections to claims 2, 12-13, 66, and 75-76 is respectfully requested.

III. RESPONSE TO THE REJECTIONS

A. INDEPENDENT CLAIM 54

Among other features, claim 54 recites:

storing undo information for removing changes that are being made to data in a storage area that includes a plurality of segments, wherein application of the undo information returns the data to which the changes were made to a state of the data that existed prior to the changes;

...

automatically adjusting a size of the storage area based on usage of the plurality of segments.

Thus, claim 54 recites undo information for removing changes that are being made to data, which information, when applied to the data, returns the data to a state that existed prior to the changes.

In contrast, WAHL does not disclose any such feature. The Office Action asserts that the information stored in WAHL's writelogs is undo information. Specifically, with respect to WAHL's Figure 1 the Office Action considers:

... the broad term of --change-- to comprise discrepancies between a local data device 16 and the correct version of the local device. For example, if a local computer system crashes, upon recovery, there is a --change-- or discrepancy between what data the local data device 16 contains and what data the device 16 *should* contain. Writelog 18 maintains updates to the device 16 that, once written to the device 16 upon recovery (column 3, line 66 – column 4, line 3) allows the local data device to --remove changes-- (remove discrepancies) to guarantee the device 16 is current. (Office Action, page 3; italics in the original.)

The Applicants respectfully disagree that the information stored in the writelogs of WAHL is undo information as recited in Claim 54.

The Office Action seems to assert that a "change" is equivalent to a "discrepancy". This is incorrect since, while a "change" may cause a "discrepancy", a "change" may also be made in such a way as not to cause a "discrepancy". In other words, the Office Action is

confusing a cause (“change”) with a possible effect (“discrepancy”), and is simply disregarding the fact that cause and effect are not logical equivalents of each other.

The Office Action also admits that, upon recovery, the information stored in WAHL’s writelogs is used to update the local data device to a state that the local data device SHOULD be in. In other words, if an update to a local data device failed, the information in WAHL’s writelogs is used to update the local data device in order to put it in a state that it has NEVER been before, i.e. the state the local data device would have been if the update had succeeded. Furthermore, in col. 3, lines 52-54 WALSH expressly states that “data is written and thus stored substantially simultaneously on both the local data device and in the writelog device”, i.e. the information stored in the writelog device is the SAME information that is being stored in the local data device. In other words, the writelogs in WAHL simply store a second copy of the updates made to the local data devices, and not any information that is helpful in any way for removing these updates from the local data devices.

In contrast, the features of claim 54 recite that the undo information is “for **removing changes** that are being made to data”, and that “application of the undo information **returns** the data to which the changes were made **to a state of the data that existed prior to the changes.**” Thus, WAHL does not disclose the claimed undo information, much less a technique for adjusting the storage space used for undo information based on the usage of the storage.

For the reasons given above, the Applicants respectfully submit that WAHL does not disclose all features of claim 54. Thus, claim 54 is not anticipated under 35 U.S.C. §102(e) by WAHL, and withdrawal of the rejection of claim 54 is respectfully requested.

B. INDEPENDENT CLAIM 2

Among other features, Claim 2 recites:

storing, in a storage space, undo information for removing changes that are being made to data by a plurality of entities, wherein application of the undo information returns the data to which the changes were made to a state of the data that existed prior to the changes, wherein the undo information for each entity of the plurality of entities is stored in a segment of a plurality of segments within said storage space;

...

Claim 2 recites the same features discussed above with respect to claim 54, namely, that the undo information is “for removing changes that are being made to data”, and that “application of the undo information returns the data to which the changes were made to a state of the data that existed prior to the changes.” Thus, for the same reasons given above with respect to claim 54, the Applicants respectfully submit that WAHL does not disclose these features of claim 2.

Furthermore, claim 2 recites a feature in which “the undo information for each entity of the plurality of entities is stored in a segment of a plurality of segments within said storage space.” The Applicants respectfully submit that WAHL does not disclose any such feature.

The Office Action asserts that, with respect to Figure 5 of WAHL, primary system 12 and primary system 14 are a plurality of entities that cause updates to local data devices 16 and writelogs 18. Although not expressly stated, the Office Action implicitly asserts that primary system 12 and primary system 14 store information in writelogs that are part of the same storage space. This is incorrect.

In col. 11, lines 54-58, and with respect to Figure 5, WAHL expressly states that

... data at the primary computer system 12 can be replicated at a plurality of **remote** computer systems 14, as compared to known architectures which provide point-to-point (local to a single remote site) data mirroring. (Emphasis added.)

Furthermore, in col. 8, lines 27-28, WAHL expressly states that “[l]ocal data storage units 26 are not shared by the primary computer system 12 and the secondary computer system 14.” (Emphasis added.)

Thus, WAHL’s primary systems 12 and 14 are REMOTE with respect to each other and do NOT share any storage space, and for these reasons the writelogs to which the systems write CANNOT POSSIBLY be located in the SAME storage space.

The best illustration of the fact that WAHL’s systems cannot possibly share the same storage space is provided in Figure 1. Figure 1 clearly shows that primary system 12 and secondary system 14 are connected by LAN/WAN link 20, and that neither system 12 nor system 14 can make changes or update the writelogs maintained by the other system. Furthermore, nothing else in WAHL shows, teaches, or describes that more than one computer system can write to the same writelogs. Therefore, the Applicants respectfully submit that WAHL does not teach a feature in which each system of a plurality of systems may store any information, let alone undo information, in a writelog of a plurality of writelogs that are located within the same storage space.

For the reasons given above, the Applicants respectfully submit that WAHL does not teach all features of claim 2. Thus, claim 2 is not anticipated by WAHL under 35 U.S.C. § 102(e), and withdrawal of the rejection of claim 2 is respectfully requested.

C. INDEPENDENT CLAIM 4

Among other features, Claim 4 recites:

storing, in a storage space, undo information for removing changes that are being made to data by a plurality of entities, wherein application of the undo information returns the data to which the changes were made to a state of the data that existed prior to the changes, wherein the undo information for each

entity of the plurality of entities is stored in a segment of a plurality of segments within said storage space;

...
...

wherein said step of monitoring usage further includes at least the step of monitoring usage in each period of time for a series of periods of time, and the step of automatically adjusting is based at least on a comparison between a usage of a first period of time and a usage of a second period of time.

Claim 4 recites the same features discussed above with respect to claim 54, namely, that the undo information is “for removing changes that are being made to data”, and that “application of the undo information returns the data to which the changes were made to a state of the data that existed prior to the changes.” Thus, for the same reasons given above with respect to claim 54, the Applicants respectfully submit that WAHL does not disclose these features of claim 4.

Claim 4 also recites the same feature discussed above with respect to claim 2, namely, the feature in which “the undo information for each entity of the plurality of entities is stored in a segment of a plurality of segments within said storage space.” Thus, for the same reasons given above with respect to claim 2, the Applicants respectfully submit that WAHL does not disclose this feature of claim 4.

In addition, claim 4 also recites the feature of “automatically adjusting based at least on a comparison between a usage of a first period of time and a usage of a second period of time.” The Applicants respectfully submit that WAHL does not disclose any such feature.

The Office Action asserts that WAHL describes use of user-defined throttles and a daemon to check a system periodically in col. 14, line 34 to col. 15, line 12. Further, in page 5, the Office Action states:

Each time the daemon examines the throttles, the Examiner is considering it a --period of time--. Further, the Examiner is considering a first period of time to be when a writelog 18 does not have a pending overflow condition, and a -second period of time-- when the writelog 18 does have a pending overflow

condition. Thus if an overflow condition is eminent at the second time period, the throttle acts to automatically adjust the number of segments 18 dedicated to an entity by assigning an extension device from writelog pool 18A.

The Applicants respectfully disagree with the above assertion that WAHL describes adjustment of the number of writelogs based on writelog usages at a first and second period of time.

The Office Action asserts that the feature of claim 4 of monitoring usage of the storage space in each period of time for a series of periods of time is equivalent to the checking for overflow and underflow conditions in writelogs at certain times that is described in WAHL. Even if it assumed that this assertion is correct (which it is not), in order to show that WAHL satisfies claim 4, the Office Action must still show that the adjustment to the number of writelogs is based on a comparison of overflow condition in a first period of time to an underflow condition in a second period of time. WAHL, however, does not describe, teach, or even hint that any comparison between an overflow and an underflow condition for a writelog is ever made. In fact, WAHL does not even teach that information about overflow and/or underflow conditions of a writelog, when encountered, is ever recorded or stored for future use.

Furthermore, in col. 14, line 63 to col. 15, line 12, WAHL describes in detail the actions that may be invoked by a throttle, but making any kind of a comparison, let alone a comparison between prior and present overflow or underflow conditions, is not an action that may be performed. For this reason, the Applicants respectfully submit that WAHL does not disclose adjusting writelogs based on a comparison between writelog usage in a first period of time and writelog usage in a second period of time.

In addition, with respect to writelogs, WAHL states that an overflow condition would have occurred “[i]f the head of the writelog device 18 becomes big enough that it would

overwrite the tail.” (Col. 7, lines 38-40.) Further, WAHL states that “throttles are user-defined tests and actions that are evaluated by the primary mirror daemon 24 periodically.” (Col. 14, lines 33-34.) WAHL also expressly states that the purpose of using throttles with respect to writelogs is “to deal with **pending** writelog device overflow or underflow conditions.” (Col. 14, lines 38-39; emphasis added.) Thus, WAHL in fact describes user-defined tests that are periodically evaluated by a daemon to deal with conditions that are pending or CONCURRENT with the time period when evaluation of the tests is performed. For this reason, contrary to the assertion in the Office Action cited above, an action defined in a throttle to automatically adjust the number of writelogs is triggered based ONLY on the conditions existing when the throttle is evaluated, and NOT based on any conditions that may have existed or will exist at any other time periods.

For the reasons given above, the Applicants respectfully submit that WAHL does not teach all features of claim 4. Thus, claim 4 is not anticipated by WAHL under 35 U.S.C. § 102(e), and withdrawal of the rejection of claim 4 is respectfully requested.

D. DEPENDENT CLAIMS 8, 17-18, 22-24, 58-59, AND 65

Claims 8, and 22-24 are dependent upon claim 4. Claims 17-18, 58-59, and 65 are dependent upon claim 54. Furthermore, claims 8, 17-18, 22-24, 58-59, and 65 include each and every feature of their corresponding independent claim. For this reason, each of claims 8, 17-18, 22-24, 58-59, and 65 is allowable for at least the reasons given above for claims 4 and 54. In addition, the Office Action states that each of claims 8, 17-18, 22-24, 58-59, and 65 includes subject matter that independently renders the claim patentable. Therefore, it is respectfully submitted that claims 8, 17-18, 22-24, 58-59, and 65 are allowable, and allowance of these claims is respectfully solicited.

E. DEPENDENT CLAIMS 3, 5-7, 10-16, 19-21, 25-26, 55-57, AND 60-64

Claims 3, 5-7, 10-16, 19-21, 25-26, 55-57, and 60-64 are dependent upon one of independent claims 2, 4, and 54, and thus include each and every feature of the corresponding independent claim. Therefore, each of claims 3, 5-7, 10-16, 19-21, 25-26, 55-57, and 60-64 is allowable for the reasons given above for claims 2, 4, and 54.

In addition, each of claims 3, 5-7, 10-16, 19-21, 25-26, 55-57, and 60-64 introduces one or more additional features that independently render it patentable. However, due to the fundamental differences already identified, to expedite the positive resolution of this case a separate discussion of those features is not included at this time. Therefore, it is respectfully submitted that claims 3, 5-7, 10-16, 19-21, 25-26, 55-57, and 60-64 are allowable for at least the reasons given above with respect to claims 2, 4 and 54.

F. DEPENDENT CLAIMS 66-102

Each of dependent claims 66-89 and 91-102 is a computer-readable medium claim that corresponds to, and depends from, one of claims 2-8, 10-26, and 54-65. Claim 90 is a computer-readable medium claims that depends from allowed claim 27. Thus, each of dependent claims 66-102 is allowable for at least the same reasons for which its corresponding base claims is allowable.

IV. CONCLUSION

The Applicants believe that all issues raised in the Office Action have been addressed. Further, for the reasons set forth above, the Applicants respectfully submit that allowance of all pending claims is appropriate. Therefore, the issuance of a formal Notice of Allowance is believed next in order, and that action is most earnestly solicited.

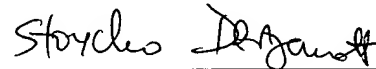
The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

A petition for extension of time, to the extent necessary to make this reply timely filed, is hereby made. If applicable, a law firms check for the petition for extension of time fee is enclosed herewith. If any applicable fee is missing or insufficient, throughout the pendency of this application, the Commissioner is hereby authorized to charge any applicable fees and to credit any overpayments to our Deposit Account No. 50-1302.

Respectfully submitted,

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